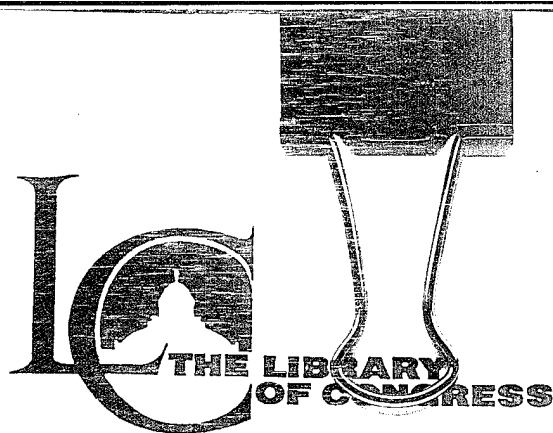


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## WOMEN IN NONTRADITIONAL OCCUPATIONS

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**Graphics:** Marla D. Woodson  
**Editor:** Andrea T. Merrill

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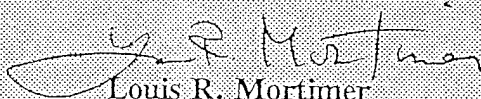
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## Preface

This study presents the results of reviews and assessments of existing literature, dating from 1988 to the present, on women in nontraditional occupations (NTO) in the United States, focusing on young female workers aged 16-34 and on selected nonprofessional NTO. Statistical trends on women in NTO and their future job potential are described. Demographic changes, racial and regional differences, and professional NTO are only partially discussed.

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## Introduction

Since early colonial days, a small number of women have worked in nontraditional occupations. They first broke the pattern of being only homemakers to become tavern owners, merchants, and shopkeepers. Despite many barriers, they managed to enter hitherto male-dominated occupations. The number of women in the workforce continued to grow, and their working world slowly evolved as young single women became the ready supply for the increasing demands for workers in factories and other industries. A large number of women subsequently concentrated in occupations that became known as "feminine"--the traditional occupations.

Nontraditional occupations are defined by the Women's Bureau of the U.S. Department of Labor as those in which women constitute less than 25 percent of the total workers in that particular occupation.<sup>1</sup> By the 1990s, nontraditional occupations (NTO) for women had become numerous, diverse, and prevalent in all groups of jobs, both professional and nonprofessional. Categorizing workers' occupations for comparison and trends is problematic because census data on occupations have changed over the decades. For example, in 1900 managerial and administrative occupations were listed under different industrial headings, and clerical and sales workers were found under trade and

transportation categories. Thereafter, occupational categories changed. Since 1980, managerial and administrative occupations have been grouped in a major occupational category, and the category of "operators, fabricators, and laborers" now includes workers in factories, in railroading, and in trucking.<sup>2</sup>

Currently, over 600 occupations are grouped into six categories and about 50 clusters. The six categories are as follows: (1) managerial and professional specialty; (2) technical, sales, and administrative support; (3) service; (4) farming, fishing, and forestry; (5) precision production, craft, and repair; and (6) operators, fabricators, and laborers. Clusters group occupations that are in the same line of work, such as protective services. This cluster of services includes firefighters, police and detectives, and guards.<sup>3</sup>

Research on women in blue-collar jobs or in NTO in general has been scant, probably because of women's historically low participation in the workforce (particularly in NTO), their overconcentration in the service category, and the fact that their work was often considered temporary or merely a desirable or required economic interlude before marriage and the raising of a family. In addition, statistics for women in NTO are difficult to measure from one period to another, as definitions for occupational categories have often changed to adapt to a particular period.

This study focuses primarily on young female workers (ages 16-34) and is concerned with selected nonprofessional NTO,



namely, the protective services of Category 3, Category 5 (precision production, craft, and repair), and Category 6 (operators, fabricators, and laborers). According to the 1990 Census on Detailed Occupations and Other Characteristics, however, certain occupations within Category 6 include occupations in which women represented more than 25 percent of the total workers. Those occupations consisted of assemblers, production inspectors, checkers, examiners, stock handlers and baggers, machine feeders and offbearers, hand packers and packagers, and printing machine, textile, apparel, and furnishings machine operators. NTO statistics presented in this study begin with the year 1980 and exclude to the extent possible the aforementioned occupations.

### **Women in the Labor Force before 1900**

Before the 1900s, the women's world was customarily identified with home and family life. The work they did was performed in the home, where they produced nearly all the necessary articles used in daily life. In addition to household chores and care of their children, most women's work consisted of spinning, weaving, and making clothing, soap, candles, and shoes. Some women worked outside the home as innkeepers, shopkeepers, craft workers, printers, and landholders. Some historians have pointed out that during the colonial period, women engaged as merchants, tavern owners, and shopkeepers were considered to be

in NTO because these were generally considered to be "masculine fields."<sup>4</sup>

With the advent of industrialization, many of the "cottage industry" products, e.g., cloth, shoes, and candles, were gradually taken over by factories. Because many men were unavailable as a result of their entrenched commitment to agricultural work or their unwillingness to toil in factories, and because older married women were likely to adhere to the culture of a "woman's place is in the home," young single women became the ready supply for the demands of factory work. At the time, their work outside the home was considered acceptable because it was deemed to be only temporary or a brief interlude before marriage and the assumption of routine family life.

During the process of industrialization, both single women and married women found employment in occupations such as those in railroads and business enterprises. About 25 percent (1.3 million) of employed women worked in manufacturing industries, and 10 percent worked in trade and transportation. In 1830 some 39,000 of the total 55,000 mill workers were young women.<sup>5</sup>

By 1900 more than 5 million women participated in the labor force annually, or 20 percent of the total female population aged 10 years and over. Of the employed women, about 25 percent worked in manufacturing industries, and 10 percent worked in trade and transportation. Occupations in trade and transportation consisted mostly of what is today considered "female dominated occupations"--sales persons, telegraph and telephone operators,

stenographers, clerks, copyists, accountants, and bookkeepers. In the last 30 years of the 19th century, women working in these occupations rose from a mere 19,000 to more than 500,000.<sup>6</sup>

### **Women in the Labor Force after 1900**

Labor shortages during World War I and World War II required the use of large numbers of women in once male-dominated workplaces--factories, business offices, and transportation--all of which had good earnings. Women were encouraged to enter nontraditional occupations such as machinists, switchmen on the railroads, precision-tool makers, over-head-crane operators, and shipbuilders. The number of women recruited for building ships, for example, rose from an infinitesimal 36 in 1940 to 160,000 in 1942.<sup>7</sup>

But most working women in NTO were replaced by men soon after each war, returning to and continuing their work only in the more traditional "female" jobs (typists, receptionists, file clerks, and the like). Some women left their nontraditional jobs voluntarily, but many were forced out by postwar layoffs.

Young single women dominated the female labor force up to the beginning of World War II. Between 1940 and 1960, their numbers dwindled because of the low birth rates of the 1930s and because many women had left the labor force to raise families. At the same time, many older married women who were available and eager for paid employment became a large part of the female

workforce.

The negative social attitudes toward women's work outside the home waned after World War II. Many working women refused to return to their old life-styles, and many other women entered the labor force because of economic necessity. Attitudes toward working wives also changed, albeit slowly. Over the years, fewer women chose to leave their jobs after they married or had children. In 1968 about 6.4 percent of working women left their jobs after they married; in 1988 only 3.4 percent left their jobs.<sup>8</sup>

Negative attitudes toward working women have declined nationally, but in some regions of the country they remain quite strong. Nationwide, 41 percent of the opinions gathered in 1992 supported the statement that "it is much better if the woman takes care of the home and family," but in the Mountain and Southeast Central regions more than 54 percent staunchly adhered to the idea of "home and family first." The Mountain region is very likely influenced by the Mormon Church; the Southeast Central region has the lowest level of female labor participation in the country because many there feel it is not "lady-like" to work outside the home.<sup>9</sup>

Women's family responsibilities will continue to affect their work behavior unless they are free of economic concerns for the welfare of their children. Women in nonprofessional occupations tend to give greater priority to family over work than those in professional fields.<sup>10</sup> The latter group can better

afford to pay for childcare or other family needs. Many young women interviewed have expressed their concern about jeopardizing their careers if they have to stay at home for a certain period because of their children.<sup>11</sup> But in some communities, stay-at-home motherhood, which fell into ridiculous disrepute in the 1980s, is becoming fashionable. Stay-at-home mothers were the norm, however, in the 1950s and the 1960s.<sup>12</sup>

In a survey in which men and women were asked to speculate on their futures, a great majority predicted considerable changes in women's status, forever altering earlier traditional attitudes. The 1991 General Social Survey seems to mirror this prediction. The number of Americans who initially argued or disagreed with the statement "A working mother can establish as warm and secure a relationship with her children as a mother who does not work" decreased from 50 percent in 1977 to 34 percent in 1991.<sup>13</sup>

The 1990 Virginia Slims Opinion Poll found a high degree of consensus in women's and men's attitudes about the changing roles of women. Men expressed support for women's improved status in society, and both sexes believed that sex discrimination remained an important problem in the workplace. Men agreed that, to help women balance jobs and family, they must take on more household chores themselves.<sup>14</sup> Some sociologists believe that better educated husbands were more likely to take on and readily accept basic household tasks.

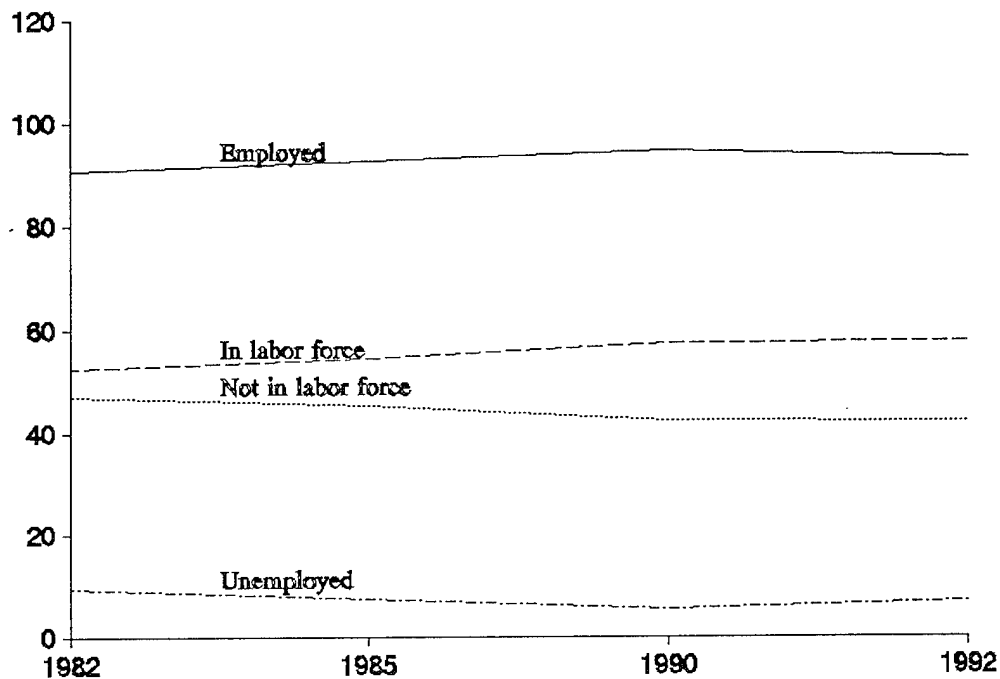
In the 1960s, young married women with preschool- or school-

age children began to join the working world. The proportion rose dramatically in the subsequent two decades, from 19 percent of women with preschool or school-age children in the 1960s to 52 percent in 1985. Of the 50.3 million employed women in 1987, 59.2 percent were married, and most were in their prime childbearing years. As divorce rates and teenage pregnancies continued to rise, divorced mothers and young single mothers found it economically essential either to enter the workforce or to remain in it. Women returned to work after childbirth sooner than ever before. It became common to find two-income families and one-income families headed by a single parent.

Women participating in the labor force increased from 52.7 percent in 1982 to 57.8 percent in 1992 (see table 1, Appendix). The number of employed women rose from 90.6 percent in 1982 to 93.1 percent in 1992 and almost 93.4 percent in June 1993. Between 1990 and 1992, the rate of unemployed women also was on the rise, going from 5.4 percent to 6.9 percent (see fig. 1; table 2, Appendix).

The number of young working women (ages 16-24) decreased between 1983 and June 1993, from 11.3 million to 8.8 million (see table 3, Appendix). Women in this age group have declined but are expected to increase again by the year 2000. The decline was caused by falling birth rates from the 1970s through the mid-1980s. The surge in the birth rate in the late 1980s will contribute to the rise in the number of women in this age group. The number of women in the labor force aged 25-34, however, will

Figure 1. Employment Status of Women, 1982-92  
(In percentages)



Source: Based on information from U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Washington, July 1993, 10.

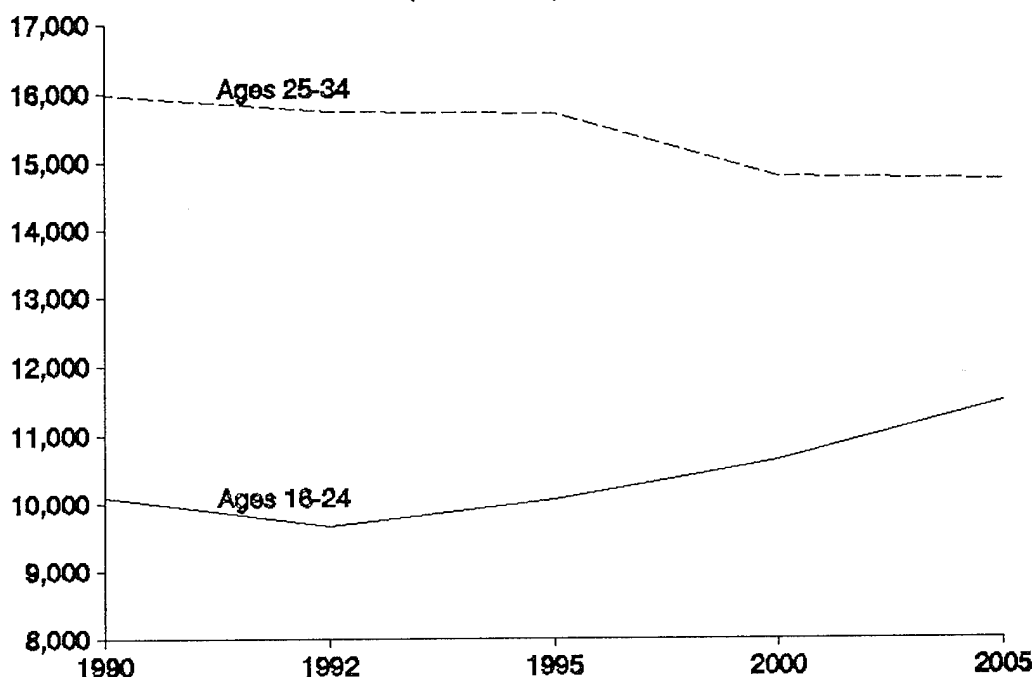
continue to decrease through 2005 (see fig. 2; table 4, Appendix).

Young women aged 16-19 who were seeking employment for the first time were increasing at a faster rate than young men in the same age group, according to a study done in 1990. Continuous employment is not currently the norm among young women but seems to be a growing trend.<sup>15</sup>

Prompted by economic forces, women in general are found in large numbers among the group of workers with two or more jobs

and in temporary or part-time jobs. Women constituted 33 percent of the workers holding more than one job in 1980 and increased to 43 percent in 1989. Of the estimated 3.1 million working women with more than one job in 1989, 132,000 were between 16 and 19

**Figure 2. Projected Total Women in the Labor Force by Selected Age Group, 1990-2005**  
(in thousands)



Source: Based on information from U.S. Department of Labor, "Outlook: 1990-2005," Monthly Labor Review, November 1991; and U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Washington, January 1993, 174.

years old; 399,000 were between 20 and 24; and 957,000 were between 25 to 34. In all age groups, almost half of the women were married, 27 percent were single, and the remaining were



either widowed, divorced, or separated.<sup>16</sup> Women are also involved in working extended hours. In 1990 about 9 percent of the female workforce worked extended operating hours in manufacturing, but the percentage was higher in private and public services, consisting of 42 percent and 38 percent, respectively.<sup>17</sup>

Temporary or part-time employment can benefit both employees and employers. Many workers prefer part-time employment, especially women who need to care for children or other family members, young people who are in school, and older people who seek to go into semiretirement. Of the 20 million part-time workers, however, an estimated 6 million prefer full-time jobs. But an estimated 3 million full-time workers would rather change to part-time employment. Employers can gain from part-time employment by lowering cost benefits and increasing work productivity.

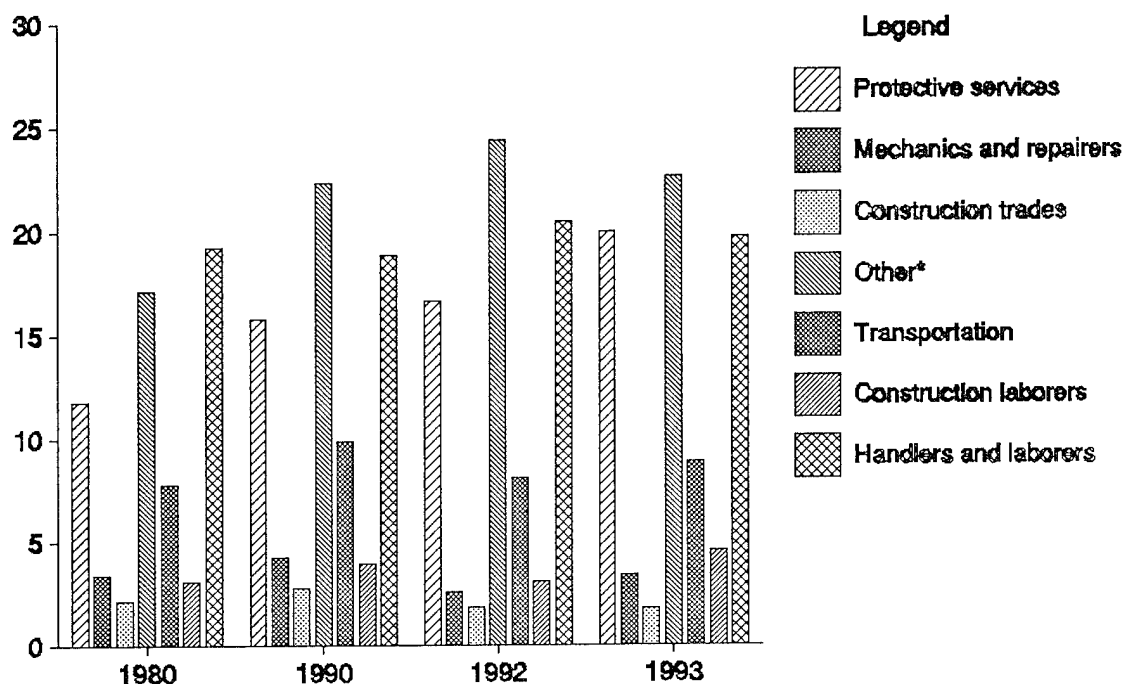
In the past few decades, women have been able to reenter some of the nonprofessional male-dominated occupations in higher numbers. The number of women in traditionally male blue-collar jobs reportedly increased from 2 percent in 1940 to 8.7 percent in 1989. Gains in skilled blue-collar jobs, however, were small and were decreasing. This decrease is the result of women's continued preference for "feminine" jobs, the difficulties in overcoming barriers erected by employers in most skilled trades, and the hard choices women must make, e.g., sometimes a trade off between putting up with sexual harassment and realizing better earnings. Parental influence, traditional education, and

recruitment policies of companies continue to discriminate against women in most blue-collar occupations.<sup>18</sup>

Working women in nontraditional occupations numbered slightly over 5 million, accounting for 18 percent of all nonprofessional NTO in the 1980s. In selected nonprofessional NTO, their number increased at the following rates between 1970 and 1980: 3.3 to 6 percent in skilled crafts; 0.9 to 1.9 percent in mechanical and repair jobs; 1.4 to 3.9 percent in metalworking; 4 to 8.7 percent as motor vehicle operators; 0.5 to 2.5 percent in construction; 5.9 to 15.7 percent in manufacturing; and 3.9 to 12.7 percent in other industries.<sup>19</sup> This increase continued until 1990 but has since diminished, with the exception of workers in protective services (see fig. 3; table 5, table 6, Appendix). This last occupation has been on the rise, increasing at an annual average growth rate of 6.2 percent between 1980 and 1990 and as high as 12.0 percent in June 1993. The number of employed women in Category 5 (precision production, craft, and repair) and in Category 6 (operators, fabricators, and laborers) rose slightly from 1990 to June 1993 except those in "other" precision production, craft, and repair occupations.

The number of employed women aged 16-19 in mechanics, repairs, and transportation occupations declined between 1990 and June 1993 (see table 7, Appendix). Conversely, those in protective services and in construction labor occupations rose. Those in other selected NTO experienced irregular peaks and valleys.

**Figure 3. Employed Women in Selected  
Nontraditional Occupations, 1980-93**  
(in percentages)



\* Includes other precision production, craft, and repair occupations.

Source: Based on information from U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Washington, July 1993, 31; and U.S. Department of Labor, Bureau of Labor Statistics, Census Population Survey: Annual Average Data, Washington, 1992, 1993.

A study on career choices of female high school graduates between 1979 and 1983 identified some factors affecting the choice of NTO. The women who sought nontraditional occupations were typically from middle-income homes, had better than average academic abilities, and were more interested in establishing a career than in getting married. The percentage of women who left their NTO jobs in the civilian sector was higher than those in the military, amounting to 44 percent versus 20 percent,

respectively.<sup>20</sup>

Of the 53.3 million employed women in 1991, 41.2 percent had completed four years of high school, and 12.2 percent had completed 11 years of schooling or less. Only 28.2 percent of the total employed women were employed in NTO Category 3 (services), Category 5 (precision production, craft, and repair), and Category 6 (operators, fabricators, and laborers). Employed women who had completed four years of high school represented the majority of women in those occupations and 10.4 percent of the total (see table 8, Appendix).<sup>21</sup>

From 1980 to 1990, the number of young female workers aged 16-24 with a high school education decreased (see table 9, Appendix). Especially in the 16-19 age group, the number of women without a high school diploma outnumbered the graduates by more than two to one in 1990. In 1980 the difference was only about 41 percent. The participation in the labor force of female high school dropouts aged 16-24 decreased between 1980 and 1990. But the rate of participation increased from 52.4 percent in school year 1979-80 to 56.3 percent in school year 1989-90, with a little setback in school year 1984-85. The total number of female dropouts also decreased (see table 10, Appendix).<sup>22</sup>

### **Job Trends**

Predictions on future new jobs, labor shortages, and skill gaps in the 21st century have been made by several futurists. They point to industries where employment of largely unskilled

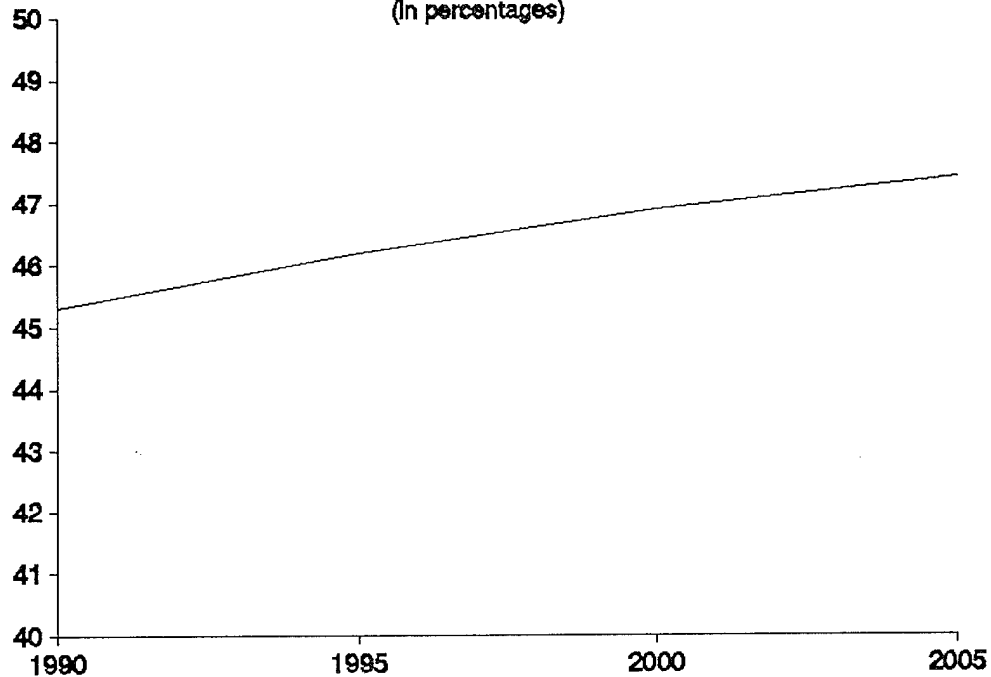
labor has expanded rapidly in recent years but add that the future demand for more "adequate technical skills" will be greater than in the past.<sup>23</sup> Some experts have disagreed with the prediction of labor shortages, contending that labor shortages will be experienced only by certain industries or occupations whose skills requirements will be in the fast-growing category of high-technology jobs. These jobs will constitute only 4 percent of the total jobs in the year 2000.

Other factors causing potential labor shortages are attributed to demographic changes. The total labor force for the year 2005 is projected to number about 150 million, up from 115 million in 1985. This growth, seemingly rapid, is actually slower than that encountered in the 1930s. The supply of new workers will barely meet the demands of new projected jobs.<sup>24</sup> The labor force projection by sex indicates that by the year 2005, there will be close to 143 million workers, of which 47.4 percent will be women (see fig. 4; table 11, Appendix).

A survey by the Commission on the Skills of the American Workforce found only 15 percent of the companies reported shortages in chronically underpaid "female occupations" and traditional craft trades, whereas 80 percent of the companies complained about "skills" shortages. "Skills" in this context includes a good work ethic (reliability) and good social behavior (positive attitude).

Ninety percent of all projected new jobs will be in the sectors of the economy producing goods and services. The goods-

Figure 4. Projected Total Women  
in the Labor Force, 1990-2005  
(In percentages)



Source: Based on information from U.S. Department of Labor, "Outlook: 1990-2005," Monthly Labor Review, November 1991.

producing sector includes the manufacture of durable goods and nondurable goods. The service-producing sector includes transportation, communications, utilities, trade, finance, insurance, real estate, government, and the service industries (business, legal, educational, health, and social services).

From the recorded trends of the 1970s and the 1980s, service industries can be expected to continue their predominance in the 1990s, employing 90 percent of the new workers. Manufacturing, however, is expected to decline and will employ a little less

than 5 percent of the workers.<sup>25</sup>

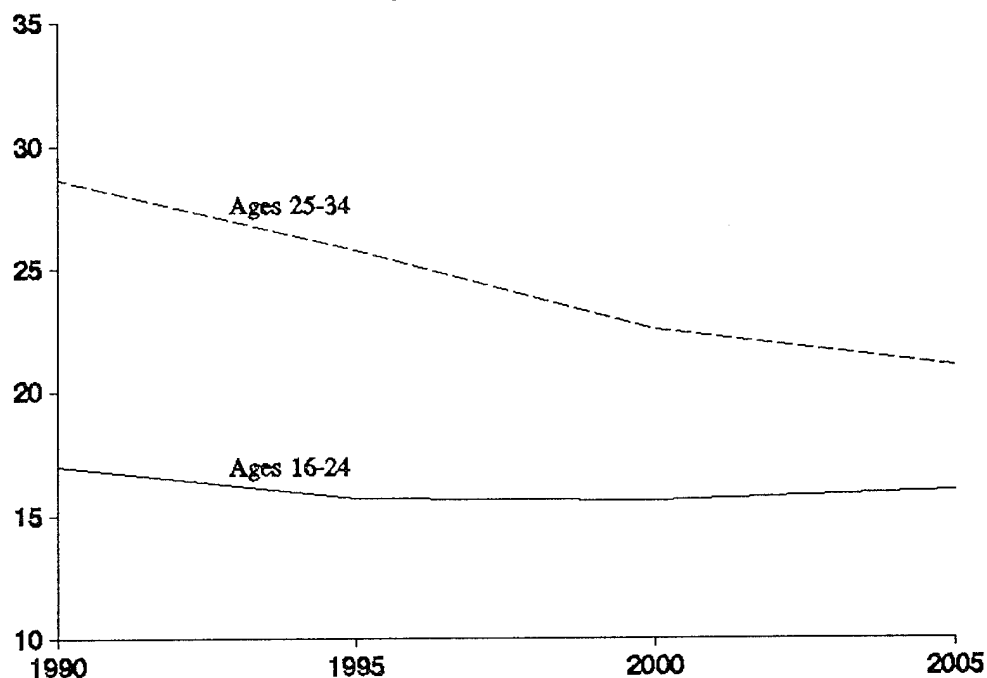
Other predictions conclude that more than half of the new jobs will require more than a high school education. Currently, 30 percent of the students who start high school do not graduate.<sup>26</sup> The occupation adding the most jobs by the year 2005 will be "retail clerk."<sup>27</sup>

Some of the top fifty fastest growing occupations as seen by the U.S. Department of Labor are in the protective services. Other fast-growing occupations include automotive body repairers, machine tool programmers, numerical controllers, gardeners and groundkeepers, plastic-working machine operators, and tilesetters. Overall employment for mechanics, installers, and repairers is expected to grow 13 percent--from 4.8 to 5.5 million--because of the increased use of mechanical and electronic equipment. The construction trades and extractive occupations are projected to increase 16 percent--from 4.0 to 4.7 million workers; and transportation and material moving occupations are expected to grow 12 percent--from 4.6 to 5.2 million. The production occupations (workers who install, adjust, operate, and tend machinery and equipment and those who use hand tools and hand-held power tools to fabricate and assemble products) are seen as increasing by 2 percent--from 12.5 to 12.8 million workers; and handlers, equipment cleaners, helpers, and laborers are also expected to increase about 2 percent--from 4.9 to 5.0 million workers.<sup>28</sup>

About 1 million projected new jobs in the less skilled and

labor occupations will cause labor shortages of young workers and will increase competition among institutions of higher learning, business, and the military. These organizations will vie for youths aged 16-24, as this group will decrease from the 20 percent of the labor force in 1985 to a projected 16 percent in 2000.<sup>29</sup> According to labor projections of the U.S. Department of Labor, this age group will decrease even more, to 15.6 percent in 2000 but will then increase to 16.0 by 2005 (see fig. 5; table 12, Appendix).

**Figure 5. Projected Total Labor Force by  
Selected Age Group, 1990-2005**  
(in percentages)



Source: Based on information from U.S. Department of Labor, "Outlook: 1990-2005," Monthly Labor Review, November 1991.



Some 61 to 63 percent of new entrants in the labor force between 1985 and 2000 will be women.<sup>30</sup> The number of women participating in the labor force will continue to grow as overall labor shortages will favor them because of the lower number of men, provided that women can acquire the needed technical skills, especially in information technologies.<sup>31</sup> Women will be overrepresented in high-technology occupations if the optimistic nature of the predictions prevails. But the less favorable projections point toward more low-technology or no-technology service occupations.<sup>32</sup> More than 60 percent of new female workers are expected to work full-time, and a large number of the remainder will work part-time.<sup>33</sup>

Projected NTO in the 1990s job market and the number of workers needed are in the service industries (see table 13, Appendix). Many of the projected fast-growing occupations will be the result of new technologies. The growth rate refers to the growth of an occupation during the 1990s.<sup>34</sup>

In the foreseeable future, a number of companies are planning to increase their workforces with only temporary or part-time workers or consultants.<sup>35</sup> This planning is reflected in the large number of reported new part-time jobs; some 60 percent of the more than 1.2 million new jobs created in the first seven months of 1993 were part-time.<sup>36</sup>

### **Education Trends**

The continuing shift from manufacturing to service industries will require well-developed social and technical skills. New work skills will be driven by the greater use of information technologies, new requirements for education, and the redesign of many jobs to include more efficient computer-based employment. At least half of the new jobs will not require more than a high school education, and often less.

Although there are no formal education requirements for many of the NTO, most employers nevertheless prefer to hire high school graduates. Workers such as automotive body repairers, for example, must be able to read and have basic mathematical skills in order to follow instructions and diagrams in technical manuals and to make precise measurements of the position of one body section relative to another.<sup>37</sup>

According to the American Society for Training and Development, better schools are greatly needed to train people for career progression and for employment in technical trades. The lack of better schools puts pressure on business and industry leaders to become more directly involved in bringing about improvements in education. Too many young workers lack basic skills (reading, writing, and arithmetic). One of the forecasts concluded that 75 percent of new workers will be qualified for only 40 percent of the new jobs created between 1985 and 2000.<sup>38</sup>

It is expected that during the 1990s the majority of students of both sexes will continue to be susceptible to dropping out of school, and about half of the high school

graduates will not go on to college. Unemployment in the 16-24 age group, including the dropouts, will be high. Their social problems, experiences in drug and child abuse, and higher mortality rates will increase.<sup>39</sup>

Many teachers, who begin their careers believing strongly that all children can learn, are soon disillusioned. Lack of parental support for the students, inadequate support of school administrators, and myriad social problems in school were cited as reasons. A recent survey of teachers by the Metropolitan Life Insurance commissioned by Louis Harris & Associates found that after two years of teaching, idealism is dampened.<sup>40</sup>

A number of corporations are deeply troubled by deficiencies in basic skills among entry-level workers. Some are willing to provide remedial programs for teaching reading, writing, and arithmetic to new employees, whereas others rightly complain about having to spend valuable time and millions of dollars on these remedial programs. Forty percent of the 1,000 surveyed organizations in all types of industry have provided remedial training in basic skills to their employees. Fifty-two percent of those in manufacturing provided such training, as did 41 percent of those in transportation, communications, and utilities. Even in smaller companies, the need for remedial education is common.<sup>41</sup> Businesses that have tried to create high-skill jobs found their workers deficient in basic skills. An estimated 2 million of such jobs have been eliminated since 1980.<sup>42</sup>

Another survey indicated that 74 percent of employers are

willing to spend time and money with a school to ensure a better trained workforce.<sup>43</sup> With good reason, many employers no longer believe a high school diploma guarantees proficiency in basic academic skills, and they seek workers who have the knowledge that makes them readily educable in job-specific training.

To better influence the future supply of workers, some companies are providing the educational system with a variety of incentives, new ideas, and cooperative agreements. In Pekin, Illinois, for example, IBM's "Writing to Read" program immeasurably helped first graders, cutting the need for later remedial teaching from 11 percent to 2 percent.<sup>44</sup> In Minneapolis, 3M Corporation has a 12-year-old program called TECH (Technical Team Encouraging Career Horizon) in schools where each year women scientists come to encourage students, especially girls, to take an interest in science. Honeywell has a similar program called "Women in Technology."<sup>45</sup>

Ninety-five percent of 1,072 high school principals surveyed agreed that a school's curriculum should be altered to include career-related courses to better prepare students for the working world. Further, they believed in and encouraged employers' involvement in a youth apprenticeship system. Ninety-six percent of the employers surveyed concurred.<sup>46</sup>

Younger women are more likely to enroll in two-year vocational courses than older ones. In October 1990, 7 percent of all females aged 18-19 were enrolled, compared with 3 percent of women aged 20-24 and 2 percent of those aged 25-34. Non-high

school graduates, who presumably were most in need of further education, were the least likely to take vocational courses. Only 3 percent of non-high school graduates were enrolled, compared with 6 percent of high school graduates.

The unemployment rate was higher for female vocational students than for their male counterparts. In 1990, 31 percent of females aged 18-34 were not employed, whereas 18 percent of male vocational students in the same age group were not employed. Also, younger vocational students were less likely to have full-time jobs. Almost 79 percent of male and female students aged 18-19 were working part-time or were entirely out of the labor force, compared with 34 percent of the older group (ages 25-34).<sup>47</sup>

Vocational and community colleges around the country are actively recruiting women for nontraditional courses. Each fall, for the past three years, 150 high school sophomore girls have attended "It's High Time for High Tech Careers" seminars at East Central College in Union, Missouri, and at Jefferson College in Hillsboro, Missouri. The seminars, sponsored by the Mineral Area College Consortium, provide futurist speakers, high-technology demonstrations, and interactive experiences in telecommunications, lasers, robotics, computer-aided drafting, and computer numerical control.

To overcome barriers to deficiencies in science and mathematics, Ashland Community College in Kentucky provides a 40-hour workshop for NTO. Students take part in mathematics, science, and computer programs called the "The Techno-Fear Fair,"

which gives a festive atmosphere to these normally high-anxiety topics and helps reduce students' inherent fears of the subjects. Local businesses, the community college, environmental groups, the Coast Guard, and the Marine Academy of Science and Technology sponsor a program in a summer camp for 15 girls in seventh grade in two urban school districts to more effectively expose girls to nontraditional careers and relevant issues.<sup>48</sup> The Living Classrooms Foundation, an organization under contract to the Washington and Baltimore city governments, provided 40 boys and girls aged 14-18 with a six-week program of work, education, and fun--and a small wage for their work. The youths learned about carpentry, mathematics, physics, and painting associated with constructing and restoring boats. They also learned writing, editing, grammar, and publications layout.

About a dozen satellite public schools have been in operation in Florida, Massachusetts, and California with the cooperation of businesses. They are located on business sites and in buildings that serve companies' employees who have school-age children. Businesses use this type of school as an employee recruitment and retainment tool.<sup>49</sup>

### **Training**

Most of the projected future jobs in NTO require either vocational education, apprenticeship, or on-the-job training. In addition, women must be in good physical condition to cope with

work hardships. Many of the nonprofessional NTO also require agility and other related physical skills. A firefighter, for example, is required to have not only mastery of an emergency medical technician's course to qualify for rescue and the basics of firefighting but also physical strength and agility.<sup>50</sup>

According to the American Society for Training and Development, US\$210 billion is spent on all kinds of training, including worker training and high school vocational courses. On-the-job training is increasing but continues to be skewed toward professional and white-collar workers. Of the US\$30 billion corporate training budget in 1992, only 9 percent was designated for skilled crafts workers and 5 percent for labor and production workers. A total of almost 41 million workers received training from their employers in 1992, 4 million more than in 1991 and about 1.5 million more than in 1990.

Although some mechanical occupations such as aircraft mechanics can be learned through on-the-job training, most of these workers had already learned their jobs in the Armed Forces. They had acquired enough experience to satisfy the work requirements for Federal Aviation Administration certification.<sup>51</sup>

Youth apprenticeship is said to be a means of preparing students for the workplace, according to a survey conducted by the National Alliance of Business. Youth apprenticeship is a school-to-work transition program aimed at careers that do not require a four-year college degree.

The federal and state governments offer 125 programs on

training, information and technical assistance, and outreach serving women. These programs prepare women for NTO in many fields. They include physical fitness training to build strength and endurance for certain NTO requirements, counseling on the realities of the working world of NTO, job development and placement, and support services. Each state offers one or more programs.<sup>52</sup>

The Department of Labor's Bureau of Apprenticeship and Training promotes apprenticeship for potential sponsors, and it registers apprenticeship programs nationwide. In 1990 some 43,000 programs were registered for about 800 different occupations with about 283,000 civilian and 44,000 military apprentice participants. Special programs designed to help recruit and prepare women for apprenticeship are still reaching only a few women, however. Women's representation in these programs accounted for only 7 percent of the total registered apprentices, substantially lower than their participation in the labor force. This underrepresentation was attributed to women's not being aware of apprenticeship opportunities; not meeting entrance requirements for apprenticeships, particularly in such NTO as electricians and steamfitters; and being subject to hazing and harassment after they did become apprentices. Consequently, they concentrated mostly on lower paid female traditional occupations such as cosmetologists and computer operators.

Women accounted for only 6 percent of the total apprentices in nontraditional occupations. The highest participation rates



were in corrections, electronic mechanics, ship and boat electricians, and operating engineers (see table 14, Appendix). The percentage of women employed in the particular occupation compared with that of those participating in occupational apprenticeships is shown on table 15, Appendix.

In assessing the efficiency of apprenticeship programs, the U.S. General Accounting Office found the programs, so far, ineffective. It gave as the main reasons the infrequent use of apprentices by U.S. employers and women's general lack of interest in registering for available apprenticeships. Whereas the number of women registered in these programs grew rather rapidly in the 1970s and early 1980s, since 1983 the numbers have slowed considerably. The causes for this decrease include upper age limits for some programs, inadequate ratings given education and background factors (algebra, physics, or blueprint reading) for entry programs, and poor physical condition of some of the women.<sup>53</sup>

In August 1993, the federal government enacted the School-to-Work Opportunities Act of 1993. This act is designed to provide federal funding to states and communities to develop and implement programs to prepare non-college-bound youths for the job market.<sup>54</sup>

Except for occupations that require mechanical know-how acquired through formal training in trade schools or the Armed Forces, training for other selected and less demanding NTO can be acquired through on-the-job training or apprenticeship. Training

information for NTO is disseminated by organizations formed for a specific occupational category. Such organizations include the National Association of Trade and Technical Schools, the Associated Builders and Contractors, the International Union of Elevator Constructors, and the Electronics Industries Association.<sup>55</sup>

Electronics services, such as electronic home equipment repair, one of the future fast-growing occupations, require skills, knowledge, and adequate training for entry-level jobs. These skills can be obtained through on-the-job training in another related occupation or through the military services, where acquired training and work experience are useful in related civilian electronics work.<sup>56</sup>

Training provided by private employers is on the rise, 7 percent higher in 1993 than in 1992, according to a recent survey of 2,500 companies having more than 100 workers. The number of workers receiving training rose from 41 million in 1992 to 47 million in 1993.

Other private training programs include those provided by women who have mastered the trades. One female rural contractor, for example, ran a rural retreat called "Women Empowering Women" (WE Women) to teach women basic building skills. Women came from all walks of life, including the military. Ten percent of women from WE Women have become union apprentices.<sup>57</sup>

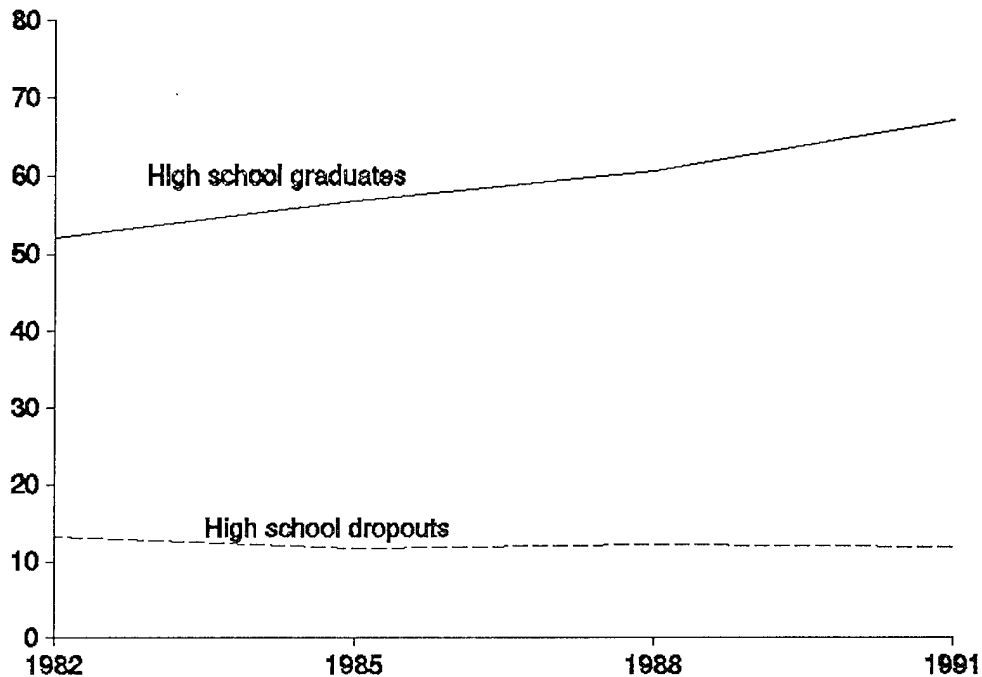
### **Future Developments**

Women will have a better chance in the 1990s than previously to participate in NTO, but mostly in professional occupations. From 1982 to 1991, the percentage of female high school graduates enrolled in either a two-year or a four-year college rose steadily, from 52.0 percent to 67.1 percent, whereas the percentage of female high school dropouts steadily decreased from 13.3 percent to 11.9 percent (see fig. 6; table 16, Appendix). Very few of the 263,607 women with associate degrees in 1990 had selected nonprofessional NTO as a preferred career: a scant 0.1 percent in mechanics and repairers; 1.2 percent in precision production; a mere 0.1 percent in transportation; and 0.0 in construction trades.

The number of working women in selected nonprofessional NTO will remain about the same in the 1990s as in 1989, if not slightly less. According to the U.S. Bureau of Labor Statistics, women's representation in traditional blue-collar jobs grew only 6.7 percent in 49 years, from 2 percent in 1940 to 8.7 percent in 1989. Factors causing this sluggish growth rate included increased use of technology, which reduces overall demand for manual service-type skills; continued preference for "female-type" occupations; family issues and financial concerns that must be satisfied through more ready employment; and continued subtle discrimination barriers encountered in service industries.

Women leaders in the trade industries will provide the best incentives to actively recruit and encourage other women to follow in these occupations. They represent desirable role

Figure 6. Female High School Graduates Enrolled in  
College Compared with High School Dropouts, 1982-91  
(In percentages)



Source: Based on information from U.S. Department of Education, Office of Educational Research and Improvement, The Condition of Education, Washington, 1993, 24; and U.S. Department of Education, Office of Educational Research and Improvement, Digest of Education Statistics, Washington, 1992, 109.

models--women who have already broken the "glass ceiling" of the male-dominated working world and who can give other women a chance to do the same. In the construction trades, for example, in 1990 they accounted for only 13.2 percent of the managers and executives in construction, but they were the ones who hired most of the women construction workers and led them into the trades. Male contractors and unions, conversely, were less inclined to hire women.<sup>58</sup>

Society is likely to change, albeit slowly, in order to respond to many of women's needs by offering new initiatives in the home and in the workplace. With new technology, both men and women are now able to work at home, telecommute to the office, and share household responsibilities.

By the year 2000, the number of women in the labor force between the ages of 16 and 34 will fall to 25.4 million from the 26.1 million of 1990. Replacing many of the younger workers will be women aged 35 and older. Women will account for 61 to 63 percent of new entrants into the workforce between 1985 and 2000. By 2000, women will represent 46.9 percent of the workforce, and 61 percent of these will be employed.<sup>59</sup>

Demographic changes will dictate many corporate priorities for women. With record numbers of working women, single parents, two-career couples, and an aging population, more businesses will need to come to grips with the problems and demands of a diverse workforce. They will make greater efforts to recruit women in NTO and provide training, upward mobility, and pay equity, and they will likely include family policies in their standard personnel practices, such as allowing considerable work at home, flexible work schedules, and generous parental leave.<sup>60</sup> According to a study by the Department of Labor, about two-thirds of the new workers in 2000 will be women, of whom about 75 percent will become pregnant during their period of employment.<sup>61</sup>

More progressive employers will try harder to overcome past discriminatory barriers. The decline in occupational segregation

will continue in the 1990s. The women who will have gained most by this decline will be young women in mid-career. Higher budgets and increased needs for services by some employers will require an upward surge in the use of part-time workers and the extended use of work-time flexibility. For the employer, part-time workers performing work normally done on a full-time basis or sharing a full-time job reduce costs such as regular benefits and unemployment compensation. For the employed, part-time workers find such work attractive because it enables them to manage domestic responsibilities more easily.

The national job skill standards, currently under consideration for legislation by Congress, if enacted, will greatly serve the millions of high school graduates entering the blue-collar workforce. The skill standards will apply to clusters of occupations involving one or more industries. These standards will identify the "knowledge, skill, and levels of competency" required of potential workers in order to perform efficiently in specific occupations.

### **Summary**

The number of women in selected nonprofessional NTO rose slowly from the colonial days through the 1980s, but after that began to decline. In NTO Category 3 (services), however, particularly in protective services, women have been rapidly increasing. They are found in large numbers in such occupations

as guards and police, less so as firefighters. The latter job requires more rigorous physical capabilities, which few women can meet. In Category 5 (precision production, craft, and repair) and Category 6 (operators, fabricators, and laborers), the number of women has declined since 1990.

By the year 2000, new technology will render many occupations obsolete. Projected fast-growing jobs will go to persons with high-technology skills. There will nevertheless be about 1 million new jobs in the low-technology and no-technology occupations, which will cause labor shortages of young workers. This shortage will increase competition among institutions of higher learning, businesses, and the military. Women will represent about 61 to 63 percent of the new entrants to the labor force between 1985 and 2000.

Education has been inadequate or unavailable for high school dropouts or for those with less than a high school diploma. Even for some workers with high school diplomas, their basic skills were found deficient. Remedial training had to be provided in practically every workplace, from small businesses to large corporations. Businesses have been pressured to get involved in reforming the education system and have begun to produce some good results.

Training for most of the selected nonprofessional NTO can be acquired on-the-job, by apprenticeship, through vocational schooling, or in the Armed Forces. Some occupations require workers to have adequate basic skills before receiving any on-

the-job training, but many workers are not sufficiently grounded in the basics. Other types of occupations may also require training from vocational schools or use skills acquired in the military service.

Federal- and state-run programs for apprenticeships exist but have been assessed as generally ineffective. U.S. employers use apprenticeships infrequently, and few women are interested in taking advantage of these programs when they do exist.

### **Conclusion**

In the 1990s, the number of women in the labor force will increase because of economic need and because of societal changes, making it more acceptable for women to pursue careers in addition to managing family responsibilities. Most of the new entrants will be in the older age groups (35 years old or more), as the number of the younger workers (ages 16-34) is expected to diminish by the year 2000. Institutions of higher learning, businesses, and the military will vie for these young workers. Working women will be seen in nontraditional occupations in larger numbers than ever before as a result of laws prohibiting sex discrimination; laws favoring equal pay for equal work; more stringent policies designed to preclude sexual harassment; and the powerful effect of Equal Employment Opportunity requirements. However, their numbers will be greater in professional NTO than in nonprofessional NTO.



The aggregate number of members of minority ethnic groups (blacks, Hispanics, and others) is expected to be substantially higher in 2000 than in 1990, occupying many positions presently filled by white workers. If current trends continue, the future workforce will consist predominantly of women, diverse ethnic groups, and older persons by the year 2000. The age structure of the workers will also be higher. Further study will be needed to include these demographic changes and determine the racial and regional differences that affect the culture, education, and economy of the United States.

### Appendix: Tables

- Table 1. Women in the Labor Force, 1982-92
- Table 2. Employment Status of Women, 1982-92
- Table 3. Employed Women by Selected Age Group, 1983-93
- Table 4. Projected Total Women in the Labor Force by Selected Age Group, 1990-2005
- Table 5. Employed Women by Selected Nontraditional Occupation, 1980-93
- Table 6. Employed Women in Selected Nontraditional Occupations, 1980-93
- Table 7. Employed Women (Ages 16-19) by Selected Nontraditional Occupation, 1990-93
- Table 8. Employed Women by Education and by Occupation, 1991
- Table 9. Total Women in the Labor Force by Selected Age Group and by Education, 1980 and 1990
- Table 10. Labor Force Status of Female High School Dropouts (Ages 16-24), School Years 1979-80 to 1989-90
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- Table 13. Projected Nontraditional Occupations Market in the 1990s
- Table 14. Number of Women Apprentices, 1990
- Table 15. Women Apprentices Compared with Employed Women in Selected Nontraditional Occupations, 1990
- Table 16. Female High School Graduates Enrolled in College Compared with High School Dropouts, 1982-91

Table 1. Women in the Labor Force, 1982-92\*  
(in thousands)

Year	Total Women	Number of Women in Labor Force	Percent of Total
1982	90,887	47,894	52.7
1985	93,886	51,200	54.5
1990	98,564	56,719	57.5
1992	100,197	57,960	57.8

\*Ages 16 and over.

Source: Based on information from U.S. Department of Labor,  
Bureau of Labor Statistics, Employment and Earnings,  
Washington, Washington, July 1993, 10.

Table 2. Employment Status of Women, 1982-92  
(in percentages)

Status	1982	1985	1990	1992
In the labor force	52.7	54.5	57.5	57.8
Not in the labor force	47.3	45.5	42.5	42.2
Employed	90.6	92.6	94.6	93.1
Unemployed	9.4	7.4	5.4	6.9

Source: Based on information from U.S. Department of Labor,  
Bureau of Labor Statistics, Employment and Earnings,  
Washington, July 1993, 10.

Table 3. Employed Women by Selected Age Group, 1983-93  
(in thousands)

Year	Ages 16-19	Ages 20-24	Ages 25-34
1983	3,880	7,469	13,775
1985	3,778	7,453	14,753
1987	3,875	7,137	15,561
1990	3,422	6,552	16,022
1992	2,613	5,799	14,594
1993 (June)	3,173	5,590	12,758

Source: Based on information from U.S. Department of Commerce, Bureau of the Census, Detailed Occupation and Other Characteristics from the EEO File for the United States, Washington, 1990, 20; U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Washington, January 1993, 13; and U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, Washington, 1991, 388.

Table 4. Projected Total Women in the Labor  
Force by Selected Age Group, 1990-2005  
(in thousands)

Year	<u>Ages 16-24</u>		<u>Ages 25-34</u>		Total 16 and Over
	Number	Percent	Number	Percent	
1990	10,096	17.8	15,990	28.3	56,554
1992	9,665	16.7	15,748	27.2	57,798
1995	10,054	16.2	15,705	25.4	61,936
2000	10,636	15.9	14,785	22.1	67,019
2005	11,484	16.0	14,724	20.5	71,394

Source: Based on information from U.S. Department of Labor,  
"Outlook: 1990-2005," Monthly Labor Review,  
November 1991.

Table 5. Employed Women by Selected  
Nontraditional Occupation, 1980-93  
(in thousands)

Occupation	1980	1990	1992	1993 <sup>1</sup>
Category 3: Service				
Protective services	182	330	351	428
Category 5: Precision production, craft, and repair				
Mechanics and repairers	135	185	147	152
Construction trades	102	148	89	98
Other	819	997	892	835
Category 6: Operators, fabricators, and laborers				
Transportation	375	504	427	449
Construction laborers	27	46	20	33
Handlers <sup>2</sup>	982	993	801	830

<sup>1</sup> As of June.

<sup>2</sup> Includes equipment cleaners and helpers.

Source: Based on information from U.S. Department of Commerce, Bureau of the Census, Detailed Occupation and Years of School Completed by Age, for the Civilian Labor Force by Sex, Race, and Spanish Origin, Washington, 1980; U.S. Department of Commerce, Bureau of the Census, Detailed Occupation and Other Characteristics from the EEO File for the United States, Washington, 1990; U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Washington, July 1993, 31; and U.S. Department of Labor, Bureau of Labor Statistics, Census Population Survey: Annual Average Data, Washington, 1992, 1993.

Table 6. Employed Women in Selected  
Nontraditional Occupations, 1980-93  
(in percentages)

Occupation	1980	1990	1992	1993 <sup>1</sup>
Category 3: Service				
Protective services	11.8	15.8	16.7	20.0
Category 5: Precision production, craft and repair				
Mechanics and repairers	3.4	4.3	2.6	3.4
Construction trades	2.2	2.8	1.9	1.8
Other	17.2	22.4	24.4	22.7
Category 6: Operators, fabricators, and laborers				
Transportation	7.8	9.9	8.1	8.9
Construction laborers	3.1	4.0	3.1	4.6
Handlers and laborers <sup>2</sup>	19.3	18.9	20.5	19.8

<sup>1</sup> As of June.

<sup>2</sup> Includes equipment cleaners, helpers, and construction laborers.

Source: Based on information from U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Washington, July 1993, 31; and U.S. Department of Labor, Bureau of Labor Statistics, Census Population Survey: Annual Average Data, Washington, 1992, 193.



Table 7. Employed Women (Ages 16-19) by Selected  
Nontraditional Occupation, 1990-93  
(in thousands)

Occupation	1990	1991	1992	1993 <sup>1</sup>
Category 3: Service				
Protective services	27	47	31	72
Category 5: Precision production, craft, and repair				
Mechanics and repairers	2	2	2	1
Construction trades	3	2	5	3
Other	25	16	18	26
Category 6: Operators, fabricators, and laborers				
Transportation	9	8	8	7
Construction laborers	1	1	3	5
Other <sup>2</sup>	96	80	75	88

<sup>1</sup> As of June.

<sup>2</sup> Handlers, equipment cleaners, helpers, and other laborers.

Source: Based on information from U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Washington, July 1993, 31; and U.S. Department of Labor, Bureau of Labor Statistics, Census Population Survey: Annual Average Data, Washington, 1992, 183, 193.

Table 8. Employed Women by Education and by Occupation, 1991  
(in thousands)

Occupation	Total*	Less Than 8 years	Less Than 11 years	Completed High School
Category 3: Service	9,559	784	1,845	4,617
Category 5: Precision production, craft, and repair	1,133	79	167	603
Category 6: Operators, fabricators and laborers	4,326	554	852	2,323
TOTAL	15,018	1,417	2,864	5,543
As a percentage of total employed women		2.7	5.4	10.4

\*Includes persons with higher education.

Source: Based on information from U.S. Department of Education, Office of Educational Research and Improvement, Digest of Education Statistics, Washington, 1992, 388.

Table 9. Total Women in the Labor Force by Selected Age Group  
and by Education, 1980 and 1990  
(in thousands)

Age Group and Education	1980 <sup>1</sup>	1990
Ages 16-19		
Not high school graduate	2,049	1,815
High school graduate <sup>2</sup>	1,457	820
Ages 20-24		
Not high school graduate	803	718
High school graduate <sup>2</sup>	3,220	1,990
Ages 25-29		
Not high school graduate	699	810
High school graduate <sup>2</sup>	2,532	2,247

<sup>1</sup> Twelve years of school or less.

<sup>2</sup> Includes equivalency.

Source: Based on information from U.S. Department of Commerce, Bureau of the Census, Detailed Occupation and Other Characteristics from the EEO File for the United States, Washington, 1990, 21; and U.S. Department of Commerce, Bureau of the Census, Detailed Occupation and Years of School Completed by Age, for the Civilian Labor Force by Sex, Race, and Spanish Origin, Washington, 1980, 19.

Table 10. Labor Force Status of Female High School  
Dropouts (Ages 16-24), School Years 1979-80 to 1989-90  
(in thousands)

School Year	Total	<u>Labor Force</u>		Employed	Unemployed
		Number	Percent		
1979-80	317	166	52.4	110	56
1984-85	291	152	52.2	103	49
1989-90	190	107	56.3	79	28

Source: Based on information from U.S. Department of Education, Office of Educational Research and Improvement, Digest of Education Statistics, Washington, 1992, 394.

Table 11. Projected Total Women  
in the Labor Force, 1990-2005  
(in thousands)

Year	Working Women	Percent of Total	Total Labor Force
1990	56,554	45.3	124,787
1995	61,936	46.2	134,085
2000	67,019	46.9	142,912
2005	71,394	47.4	150,732

Source: Based on information from U.S. Department of Labor, "Outlook: 1990-2005," Monthly Labor Review, November 1991.

Table 12. Projected Total Labor Force by  
Selected Age Group, 1990-2005  
(in thousands)

Year	<u>Ages 16-24</u>		<u>Ages 25-34</u>		Total Labor Force
	Number	Percent	Number	Percent	
1990	21,251	17.0	35,803	28.7	124,787
1995	21,039	15.7	34,585	25.8	134,085
2000	22,254	15.6	32,116	22.5	142,912
2005	24,048	16.0	31,679	21.0	150,732

Source: Based on information from U.S. Department of Labor, "Outlook: 1990-2005," Monthly Labor Review, November 1991.

Table 13. Projected Nontraditional Occupations  
Market in the 1990s

Occupation	Workers Needed (in thousands)	Growth Rate	Required Training
Category 3: Service			
Firefighter	197	Fast	On-the-job
Security guard	548	Fast	On-the-job
Category 5: Precision production, craft, and repair			
Bricklayer	120	Fast	Apprentice
Carpenter	901	Fast	On-the-job
Drywall installer	103	Fast	Apprentice
House rehabilitation technician	1,750	New	Apprentice
Painter, construction, and maintenance	469	Fast	On-the-job
Painter or paperhanger	317	Fast	On-the-job
Plasterer	30	Fast	Vocational
Plumber or pipefitter	390	Average	Vocational
Air conditioning, heating, refrigeration mechanic	55	Average	Vocational
Appliance repairer	28	Average	On-the-job
Cable TV installer	300	Fast	On-the-job
Electric power line, and cable maintenance	106	Fast	On-the-job
Electrician	582	Fast	Apprentice
Home electronic interactive systems	200	New	On-the-job
Home/office interactive work systems	180	New	On-the-job
Office machine repairer	59	Average	Vocational
Radio and TV mechanic	120	Fast	Vocational
Aircraft mechanic	129	Average	Vocational
Auto mechanic	638	Fast	Vocational
Battery technician, fuel cell	25	New	On-the-job
Heavy equipment Mechanic	144	Average	Vocational
Industrial machine repair	523	Average	Apprentice
Assembler	1,014	Slow	On-the-job
Auto body repairer	118	Fast	Vocational
Boilermaker	12	Average	Apprentice
Broadcast technician	17	Fast	Vocational

Table 13. continued

House rehabilitation technician	1,750	Fast	Apprentice
Robot installation and operations technician	75	Fast	On-the-job
Robot repairman	100	Fast	Vocational
Category 6: Operators, fabricators, and laborers			
Crane, derrick, and hoist operator	148	Average	Vocational
Fork lift and tow motor operator	366	Average	Vocational
Industrial laser process	600	New	On-the-job
Machinist or job setup worker	658	Slow	On-the-job
Sailor or deckhand	17	Slow	Vocational
Truck driver	2,047	Average	Vocational
Welder and cutter	517	Slow	Apprentice
Robot-programmed tool handler	75	New	On-the-job
Excavating and road machine operator	456	Average	Vocational
Construction laborer and carpenter's helper	851	Fast	On-the-job
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Source: Based on information from Cetron J. Marvin and Owen Davies, The Great Job Shake-Out: How to Find a New Career after the Crash, New York, Simon and Schuster, 1988, 256-78.



Table 14. Number of Women Apprentices, 1990  
(in thousands)

Occupation	Total Apprentices	Number of Women Apprentices	Percent of Total
<b>Category 3: Service</b>			
Corrections	12,513	3,128	25.0
Police	2,962	384	13.0
Firefighter	5,076	219	4.3
Protective signal installer	279	8	2.9
<b>Category 5: Precision production, craft, and repair</b>			
Electronic mechanic	879	198	22.5
Electrician, ship and boat	506	101	20.0
Electrician, maintenance	36,859	1,630	4.4
Construction worker	716	74	10.3
Operating engineer	4,268	835	19.6
Tool, mold, and die maker, and die cast	7,990	298	3.7
Machinist, ship	523	671	2.8
Machinist, maintenance machinist	6,236	353	5.7
Machine and maintenance repairer, mechanic	4,720	216	4.6
Shipfitter	539	51	9.5
Instrument mechanic	297	28	9.4
Painter	5,930	474	8.0
Pipefitter, ship and boat	676	54	8.0
Cement mason	2,092	161	7.7
Stationary engineer	1,183	91	7.7
Insulation worker	2,141	148	6.9
Boilermaker	1,595	104	6.5
Taper	1,028	62	6.0
Car repairer, locomotive	1,145	62	5.4
Sheet metal, reinforcing metal	11,598	444	3.8
Plasterer	1,309	67	5.1
Carpenter, cabinet maker	29,816	1,369	4.6
Tile setter	1,028	45	4.4

Table 14. continued

Millwright	3,012	120	4.0
Pipefitter	11,630	408	3.5
Structural steel	5,278	160	3.0
Plumber	12,080	279	2.3
Environmental system control installer	1,065	24	2.3
Bricklayer	4,802	98	2.0
Refrigeration	1,472	29	2.0
Diesel mechanic	744	13	1.7
Roofer	7,607	128	1.7
Auto mechanic	1,713	28	1.6
Auto body repair	385	5	1.3
Glazier	1,011	17	1.7
Drywall applicator	2,207	34	1.5
Floor layer	1,050	16	1.5
Line erector, repairer, and maintainer	3,606	39	1.1
Lather	970	14	1.4
Category 6: Operators, fabricators, and laborers			
Chemical operator	1,068	168	15.7
Offset press operator- lithographer	336	22	6.5
Welder	1,521	145	9.5
Wastewater treatment operator	288	29	10.1
TOTAL	205,749	12,447	6.0

Source: Based on information from U.S. General Accounting Office, Apprenticeship Training: Administration, Use, and Equal Opportunity, Washington: March 1992, 35-36.

Table 15. Women Apprentices  
Compared with Employed Women in Selected  
Nontraditional Occupations, 1990  
(in percentages)

Occupation	Apprentices	Employed
Category 3: Service		
Corrections	25.0	17.4
Police	13.0	11.6
Firefighter	4.4	1.5
Protective signal installer	2.9	1.5
Category 5: Precision production, craft, and repair		
Electronic mechanic	22.5	9.3
Electrician, ship and boat	20.0	1.5
Electrician	4.4	1.5
Electrician, maintenance	5.3	
Construction worker	10.3	8.8
Operating engineer	19.6	2.9
Tool, mold, and die maker, and die cast	3.7	0.9
Machinist, ship	12.8	2.0
Machinist, maintenance		3.3
machinist	5.7	
Machine and maintenance repairer, mechanic	4.6	2.0
Shipfitter	9.5	3.4
Instrument mechanic	9.4	4.5
Painter	8.0	4.6
Pipefitter, ship and boat		3.5
Pipefitter	8.0	
Cement mason	3.5	0.8
Stationary engineer	7.7	0.8
Insulation worker	7.7	0.0
Boilermaker	6.9	3.6
Taper	6.5	2.0
Car repairer, locomotive	6.0	4.5
Sheet metal worker	5.4	0.9
Reinforcing metal worker	3.8	2.6
		6.2
Plasterer	5.3	
Painter	5.1	0.0
Cabinet maker	4.6	1.4
Tile setter	3.8	1.3
	4.4	14.8
		1.4

Table 15. continued

Millwright	4.0	1.1
Structural steel	3.0	0.0
Plumber	2.3	0.8
Environmental control system installer	2.3	0.5
Bricklayer	2.0	0.0
Refrigeration mechanic	2.0	0.5
Diesel mechanic	1.7	0.4
Roofer	1.7	0.0
Auto mechanic	1.6	0.5
Auto body repair	1.3	0.0
Glazier	1.7	1.4
Drywall applicator	1.5	0.9
Floor layer	1.5	2.0
Line erector, repairer, and maintainer	1.1	2.6
Lather	1.4	0.9
Category 6: Operators, fabricators, and laborers		
Chemical operator	15.7	14.1
Offset press operator- lithographer	6.5	14.0
Welder	9.5	4.5
Wastewater treatment operator	10.1	1.7

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Source: Based on information from U.S. General Accounting Office, Apprenticeship Training: Administration, Use, and Equal Opportunity, Washington, March 1992, 37-38.

Table 16. Female High School Graduates Enrolled in  
College Compared with High School Dropouts, 1982-91  
(in percentages)

	1982	1985	1988	1991
High school graduates	52.0	56.8	60.7	67.1
High school dropouts*	13.3	11.8	12.2	11.9

\*Among persons aged 16-24.

Source: Based on information from U.S. Department of Education, Office of Educational Research and Improvement, The Condition of Education, Washington, 1993, 24; and U.S. Department of Education, Office of Educational Research and Improvement, Digest of Education Statistics, Washington, 1992, 109.

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